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OPEN SOURCE SOFTWARE ADOPTION: AN INVESTIGATION INTO MOTIVATIONS AND AMOTIVATIONS OF USERS

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ABSTRACT

Building on the theoretical underpinnings of Self-Determination Theory, this study seeks to identify the motivational factors influencing individuals' intention and extent of Open Source Software (OSS) adoption. Two conceptual models were proposed to examine OSS adopters' extent of adoption (based on intrinsic and extrinsic motivation) and OSS non-adopters' intention of adoption (based on amotivation). The two models were empirically assessed using survey data collected from 264 OSS adopters and 212 OSS non-adopters. Results show that strategy belief amotivation is the major factor for non-adopters not to use OSS and identified regulation is the major extrinsic motivation affecting the extent of adoption by adopters. However, intrinsic motivation to accomplish and capacity beliefs amotivation do not significantly affect adoption extent and adoption intention respectively. Theoretical and practical implications are discussed.

Keywords

Open Source Software, Motivation, Adoption.

INTRODUCTION

A review of the Open Source Software (OSS) literature suggests that an enduring issue revolving this field of research is the investigation of factors leading to adoption of OSS as opposed to traditional proprietary software (Krogh and Hippel 2006). This stream of work has mainly been concerned with the identification of the social and organizational factors influencing a decision-maker (e.g., organizational) in determining the adoption of OSS for the organization (e.g., Li et al. 2005). While much is learnt from the organizational perspective, little in comparison is known about an end-user adoption of OSS. To the extent that the existence and success of software, such as OSS, depends on whether there is significant number of users, it is imperative to understand the factors influencing an end-user's adoption of OSS. Furthermore, existing studies examining the motivational factors to OSS adoption primarily focused on the identification of intrinsic and extrinsic motivations, and seldom do they consider the third type of motivational factor: ***amotivation***, which refers to the lack of intentionality and thus the relative absence of motivation, intrinsic or extrinsic (Deci and Ryan 1985).

This study, hence, aims to provide a more nuanced theoretical understanding of the type of motivations and their influence on individuals' propensity for OSS adoption by explicitly considering three forms of motivational factors (i.e., intrinsic, extrinsic and amotivation). Specifically, we build on the theoretical underpinnings of Self Determination Theory (SDT) to answer the following research questions: What amotivation factors cause people not to adopt OSS? How intrinsic and extrinsic motivation factors affect the extent of adoption by OSS adopters?

THEORETICAL BACKGROUND - MOTIVATION

Motivation refers to an internal state of desire that directs goal-oriented behavior (Franken 1994). One of the general theories of motivation is SDT (Deci and Ryan 1985). The theory focuses on the degree to which human behaviors are volitional or self-determined. That is, the degrees to which people endorse their actions at the highest level of reflection and engage in the actions with a full sense of choice. Three broad categories of motivations are identified: intrinsic motivation, extrinsic motivation, and amotivation (Vallerand 1997; Deci and Ryan 1985). Intrinsic motivation refers to the behavior performed for oneself, so as to experience pleasure and satisfaction resulted from the activity. Extrinsic motivation denotes factor leading to behavior so as to achieve some separable goal, such as receiving rewards or avoiding punishment. Amotivation is defined as a loss of motivation resulted from the belief that one's actions have no effect in bringing about desired outcomes (Deci and Ryan 1985). Pelletier and his colleagues (1999) deduce that individuals could develop amotivation for different reasons. First, they believe the proposed strategies are not effective in producing the desired outcomes. Second, they believe they do not have the capacity to implement these strategies effectively. Third, even if they perceive the strategies are effective, they may not be able to maintain the effort necessary to execute the behavior, or to integrate it into their lifestyles.

It is imperative to note that amotivation is not the opposite end of intrinsic and extrinsic motivations. Amotivation is an experience of a lack of control which has been compared to learned helplessness (Abramson et al. 1993). An amotivated individual is neither intrinsically nor extrinsically motivated. He is unable to foresee the consequences of his behavior and therefore unable to understand the motives underlying it (Pelletier et al. 1999). His actions are mechanical and meaningless. Thus, he could constantly doubt his actions and is likely to give up the behavior eventually. Essentially, amotivation is a state in which people lack the intention to behave.

RESEARCH MODELS

With the understanding of the three motivation categories, we next identify the pertinent factors within each category. Our review of literature presents the Academic Motivation Scale (AMS), which anchors on the tenets of SDT (Vallerand et al., 1992; Deci and Ryan 1985) and decomposes the three types of motivation as following: (1) intrinsic motivation to know, to accomplish, and to experience stimulation, (2) the extrinsic motivation to identified, introjected, and external regulation, and (3) the amotivation of helplessness beliefs, strategy beliefs, capacity beliefs and effort beliefs.

Given that an individual could choose to adopt and not to adopt OSS, this study proposes two research models for both adopters and non-adopters.

Model 1 - Extent of OSS Adoption

Figure 1 presents the research model for adopters. Here, we investigate the effects of intrinsic motivation (to know, to accomplish, and to experience stimulation) and extrinsic motivation (identified regulation, introjected regulation, external regulation) on the users' extent of OSS adoption, which is defined as the extensity of OSS adoption. The amotivation tenet for adopters is not considered since an individual would not adopt OSS in the first place should he experience amotivation towards the adoption.

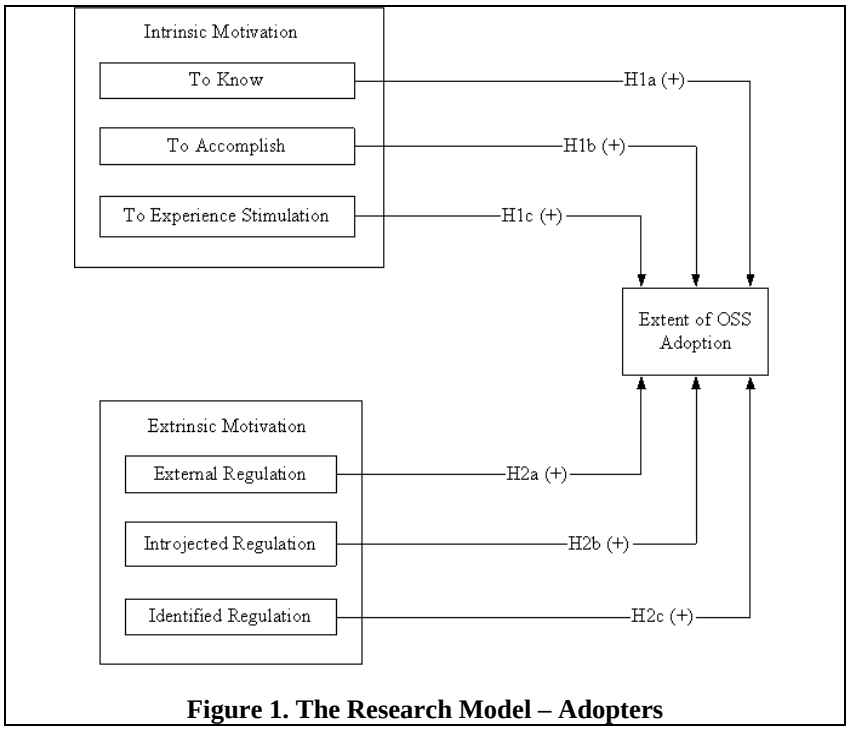

Figure 1. The Research Model – Adopters

Intrinsic motivation - to know is defined as the fact of performing an activity for the pleasure and satisfaction that one experiences while learning, exploring, or trying to understand something new (Vallerand et al. 1992). It relates to constructs such as exploration (Berlyne 1971), learning goals (Dweck and Legget 1988), intrinsic intellectuality (Lloyd and Barenblatt 1984), intrinsic motivation to learn (Brophy 1987) and intrinsic curiosity (Harter 1981). For instance, users are intrinsically motivated to know when they use OSS for the pleasure that they experience in broadening their knowledge about the different types of software available out there. Therefore, individuals who are more intrinsically motivated to know are likely to be extensive users of OSS. Hence, we hypothesize:

H1a: Intrinsic motivation - to know would positively influence an adopter's extent of OSS adoption.

Intrinsic motivation - to accomplish is defined as the fact of engaging in an activity for the pleasure and satisfaction experienced when one attempts to surpass oneself, or to accomplish or create something (Vallerand et al. 1992). It relates to constructs such as intrinsic challenge (Harter 1981) and task orientation where individuals seek to experience competence (Nicholls 1984). For instance, users who use OSS for the satisfaction they get while surpassing themselves in their software knowledge display intrinsic motivation to accomplish. Therefore, individuals who are more intrinsically motivated to accomplish are likely to be extensive users of OSS. Hence, we hypothesize:

H1b: Intrinsic motivation - to accomplish would positively influence an adopter's extent of OSS adoption.

Intrinsic motivation - to experience stimulation is operative when someone engages in an activity in order to experience stimulating sensations, such as sensory pleasure, aesthetic experiences, fun and excitement (Vallerand et al. 1992). For instance, users who use OSS because they feel a sense of excitement or because it is intellectually stimulating represent examples of individuals who are intrinsically motivated to experience stimulation. Therefore, individuals who are more intrinsically motivated to experience stimulation are likely to be the extensive OSS users. Hence, we hypothesize:

H1c: Intrinsic motivation - to experience stimulation would positively influence an adopter's extent of OSS adoption.

Extrinsic motivation - external regulation refers to behavior that is regulated through external means such as rewards and constraints (Vallerand et al. 1992). An individual pursues an activity out of external reasons such as earning rewards or avoiding punishment. For instance, a student could indicate "I am using OSS because my lecturers require us to use it." Therefore, individuals that have a high extent of OSS usage are likely to be influenced by the amount of external regulation, such as the supervisor in the case of organization and lecturer in the case of education, they face. Hence, we hypothesize:

H2a: External regulation would positively influence an adopter's extent of OSS adoption.

With ***introjected regulation***, the individual begins to internalize the reasons for his actions. However, this form of internalization, while internal to the person, is not truly self-determined since it is constrained by the external contingencies (Vallerand et al. 1992). It is as if individuals replace the external source of control by an internal one and start imposing pressure on them to ensure that the behavior will be emitted. Self imposed pressure is the source of this type of motivation. In other words, behavior is engaged due to pride or threats of guilt and shame. For instance, an employee might say: "I am using OSS because that is what an IT employee should know." Or "I need reliable software. It is important for me. Thus, I've decided to use OSS." Therefore, individuals that have a high extent of OSS usage are likely to be influenced by the amount of introjected regulation they have. Hence, we hypothesize:

H2b: Introjected regulation would positively influence an adopter's extent of OSS adoption.

Identified Regulation refers to behavior that is emitted out of choice. When behavior is identified, it becomes highly valued and judged important for the individual (Vallerand et al. 1992). It will thus be performed freely even if the activity is not pleasant in itself. People have more fully internalized and accepted it as their own. For instance, a user might say: "I have chosen to use OSS because it is more secure and software security is important to me." Therefore, it is posited individuals with high identified regulation are likely to be extensive users of OSS. Hence, we hypothesize:

H2c: Identified regulation would positively influence an adopter's extent of OSS adoption.

Model 2 – Intention to Adopt OSS

For non-adopters, we base our research model on the amotivation tenet of AMS (Figure 2). We do not consider intrinsic and extrinsic motivations for non-adopters since we focus on factors that cause them not to adopt OSS. Individual's intention to adopt is defined as the strength of conscious plans to perform the target behavior, i.e., OSS adoption (Harrison et al. 1997). Building on AMS, we examined four sources of amotivation: helplessness beliefs, capacity beliefs, effort beliefs, strategy beliefs.

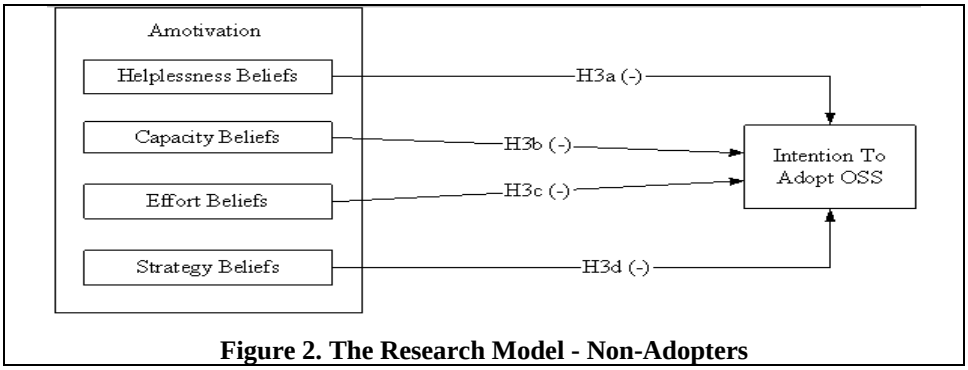

Figure 2. The Research Model - Non-Adopters

Helplessness Beliefs Amotivation refers to a general perception that one's efforts are insignificant considering the enormity of the task at hand (Vallerand 1997). For instance, users may not want to adopt OSS because they feel helpless by the challenges and intricacies of OSS and they believe nothing can reduce the helplessness. Therefore, the more helpless an individual feels towards OSS, the less likely he would want to adopt OSS. Hence, we hypothesize:

H3a: Helplessness beliefs amotivation would negatively influence a non-adopter's intention to adopt OSS.

Capacity Beliefs Amotivation is derived from Bandura's (1986) concept of self-efficacy expectancy. Self-efficacy refers to one's judgment of his capability to organize and execute courses of action required to attain a desired level of performance (Bandura 1986). Such judgment could affect activity choice, activity preparation and effort expended during performance. Moreover, the stronger the perceived self-efficacy, the higher the challenges people set for themselves and the firmer their commitment to their goals (Bandura 1991). Therefore, in addition to the required skills, action calls for beliefs of personal capacity. In other words, people may know that doing something is desirable, but may not believe they have what it takes to successfully carry out the required behaviors (Pelletier et al. 1999). For instance, users might not adopt OSS because they feel

they do not have the competence to use OSS. Therefore, the more an individual feels that he does not have the capacity to adopt OSS, the less likely he would adopt OSS. Hence, we hypothesize:

H3b: Capacity beliefs amotivation would negatively influence a non-adopter's intention to adopt OSS.

Effort Beliefs Amotivation refers to the non-desire to expend the energy required by a particular behavior. In a study on how children's motivation in school can be enhanced, Skinner and his colleagues (1990) found that children had to believe they could generate the effort required to carry out the necessary actions, and maintain the effort in face of difficulties. Likewise, adults may have trouble performing a behavior if they are unable to sustain the necessary effort, or if the behavior is difficult to be integrated into their lifestyle (Pelletier et al. 1999). For instance, users might not adopt OSS because they cannot seem to try hard enough or expend the time and effort to use OSS. Therefore, the more an individual believes he cannot expend the necessary effort to engage in OSS, the less likely he would adopt OSS. Hence, we hypothesize:

H3c: Effort beliefs amotivation would negatively influence a non-adopter's intention to adopt OSS.

Strategy Beliefs Amotivation refers to a person's belief that the proposed strategy or activity will not bring about the desired outcome. This behavioral belief is weighted by the evaluation of favorable outcomes that result from performing the behavior (Venkatesh and Brown 2001). Individuals are more likely to undertake behaviors they believe will result in valued outcomes than those which they do not see as having favorable consequences (Compeau and Higgins 1995). For instance, students may not want to adopt OSS because they feel that using OSS will not help them in their school work or improve their grades. Therefore, the more an individual feels that adopting OSS is not going to bring about a desired goal, the less likely he would adopt OSS. Hence, we hypothesize:

H3d: Strategy beliefs amotivation would negatively influence a non-adopter's intention to adopt OSS.

RESEARCH METHODOLOGY

The survey research method was chosen to assess the proposed research model. University undergraduate students are chosen as subjects in the survey as they are believed to be more adventurous when it comes to new technology adoption. Also, university undergraduate life is usually the stage in life just before the individual starts his working life. If we could find out what they feel about OSS at this stage, it will most likely reveal what new employees in the industry feel about OSS. The subjects were chosen from all disciplines so as to maximize the generalizability of the results and to avoid selection bias.

As far as possible, constructs were measured using tested questions from prior studies to enhance validity (Table 1). Some of them were modified accordingly so as to fit the context of our research. To ensure construct validity and to identify any ambiguous items, we used the card sorting procedure proposed by Moore and Benbasat (1991). All questions were anchored on a seven point Likert scale with 1 being the negative end indicating "Strongly Disagree" and 7 being the positive end representing "Strongly Agree".

Intention to Adopt OSS	Taylor and Todd 1995
Helplessness Beliefs Amotimation	Pelletier et al., 1999
Capacity Beliefs Amotivation	
Effort Beliefs Amotivation	
Strategy Beliefs Amotivation	
Intrinsic Motivation to Know	Vallerand et al., 1992
Intrinsic Motivation to Accomplish	
Intrinsic Motivation to Experience Stimulation	
Identified Regulation	
Introjected Regulation	
External Regulation	

Table 1. Scales and its Corresponding Literature

Survey Administration

University undergraduate students were recruited to participate in the survey voluntarily. A cover letter was included with the survey instrument that explained the purpose of the study and gave a description about OSS to improve the validity of the responses. As an incentive for their participation, respondents were informed of monetary benefits upon completion of the questionnaire. Respondents were instructed to complete the appropriate version of the questionnaire, depending on whether they were adopters or non-adopters. A total of 212 non-adopter responses and 264 adopter responses were collected from

students from six faculties of a public university, over a span of three weeks. Respondents were asked to fill in their demographic information such as gender, age, year of study, nationality and ethnic.

RESULTS

Mean and standard deviation for the latent variables for adopters and non-adopters are reported in Tables 2 and 3 respectively. The mean values of all variables fall between 3.6 and 4.7 with standard deviation values ranging from 1.0 to 1.6.

Construct	Code	Items	Mean	Standard Deviation
To Know	KNOW	4	4.6117	1.17172
To Accomplish	ACCOMPLISH	4	4.2699	1.20610
To Experience Stimulation	STIMULATE	5	4.0523	1.15932
Identified Regulation	IDENTIFIED	7	4.5714	1.04087
Introjected Regulation	INTROJECTED	4	3.7945	1.19892
External Regulation	EXTERNAL	4	3.6051	1.37540
Extent of OSS Adoption	EXTENT	4	3.9962	1.59326

Table 2. Descriptive Statistics of Variables – Adopters

Construct	Code	Items	Mean	Standard Deviation
Helplessness Beliefs	HELPLESS	4	4.0507	1.48455
Capacity Beliefs	CAPACITY	4	4.2854	1.41941
Effort Beliefs	EFFORT	4	4.4976	1.40812
Strategy Beliefs	STRATEGY	5	4.2962	1.35303
Intention to Adopt OSS	INTENTION	4	3.8667	1.20509

Table 3. Descriptive Statistics of Variables – Non Adopters

To evaluate the proposed research model, this study applied Partial Least Square (PLS) based structural modeling technique that is capable of assessing the causal relationship among independent and dependent variables (evaluation of the structural model) as well as measurement item loadings on their expected constructs (evaluation of the measurement model). Analysis using PLS was conducted in two stages: in the first stage, the measurement model was evaluated to assess the reliability and validity of the measures; in the second stage, the structural model was evaluated to determine the nature of relationships between the constructs. The measurement model is tested by examining convergent validity and discriminant validity of the items pertaining to each construct (see Tables 4, 5, 6, and 7).

Convergent validity can be determined through three tests: (1) Item Reliability Test (2) Composite Reliability Test and Cronbach's Alpha of the construct and (3) Average Variance Extracted (AVE) of the construct. As it is shown in Table 4 and 5, all items have reliability scores above 0.707, which implies that half the variance of the item is captured by its construct. Thus, items measuring each construct had sufficient reliability. The composite reliability of the various constructs was also above the requisite minimum of 0.7. It is known that Cronbach's alpha for constructs should be at least 0.6 and 0.7 for exploratory and confirmatory research respectively. This criterion was also met by all the constructs. Lastly, the Average Variance Extracted (AVE) of each construct was also above the required threshold of 50 percent. From these results, it is evident that the measurement model possesses adequate convergent validity.

Dimensions	Item Reliability	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
To Know		0.895	0.929	0.768
Know1	0.9281			
Know2	0.9047			
Know3	0.7907			
Know4	0.8748			
To Accomplish		0.909	0.903	0.703
Accomplish1	0.7229			

Accomplish2	0.7966			
Accomplish3	0.9960			
Accomplish4	0.8140			
To Experience Stimulation		0.928	0.890	0.622
Stimulate1	0.7317			
Stimulate2	0.9351			
Stimulate3	0.6861			
Stimulate4	0.8052			
Stimulate5	0.7622			
Identified Regulation		0.834	0.911	0.595
Identified1	0.7223			
Identified2	0.8111			
Identified3	0.8063			
Identified4	0.7915			
Identified5	0.7333			
Identified6	0.7536			
Identified7	0.7763			
Introjected Regulation		0.856	0.858	0.602
Introjected1	0.8162			
Introjected2	0.7616			
Introjected3	0.7827			
Introjected4	0.7415			
External Regulation		0.832	0.864	0.615
External1	0.7756			
External2	0.8675			
External3	0.7353			
External4	0.7512			
Extent of OSS Adoption		0.923	0.946	0.815
Extent1	0.9088			
Extent2	0.8746			
Extent3	0.9071			
Extent4	0.9197			

Table 4. Assessment of Convergent Validity – Adopters

Dimensions	**Item Reliability**	**Cronbach's Alpha**	**Composite Reliability**	**Average Variance Extracted**
Helplessness Beliefs		0.939	0.957	0.848
Helpless1	0.9177			
Helpless2	0.9220			
Helpless3	0.9360			
Helpless4	0.9067			
Capacity Beliefs		0.919	0.944	0.807
Capacity1	0.9039			
Capacity2	0.9171			
Capacity3	0.9175			
Capacity4	0.8535			
Effort Beliefs		0.887	0.919	0.740
Effort1	0.8198			

Effort2	0.8975			
Effort3	0.8602			
Effort4	0.8608			
Strategy Beliefs		0.900	0.917	0.690
Strategy1	0.9632			
Strategy2	0.8569			
Strategy3	0.7761			
Strategy4	0.8160			
Strategy5	0.7208			
Intention to Adopt OSS		0.893	0.926	0.759
Intention1	0.8906			
Intention2	0.8759			
Intention3	0.7995			
Intention4	0.9145			

Table 5. Assessment of Convergent Validity – Non Adopters

Discriminant validity is assessed using two tests: (1) Item Loading and (2) Item Correlation. The factor analysis performed showed no cross-loading factors. The factor loading of every item on its intended construct was greater than the commonly accepted value of 0.5. The second test for discriminant validity involved assessing the correlations between variables in any two constructs using PLS Graph Version 3.00. Each indicator should correlate more highly with other indicators measuring the same construct than with indicators measuring other constructs. This can be determined by examining whether the squared correlations between constructs (shared variances) are less than the average variance extracted for a construct (Igbaria et al 1994). The results highlighted in Tables 6 and 7 show that all constructs in the study satisfy the requirement for discriminant validity. Overall, the results provide strong evidence of the validity of the constructs.

Construct	Know	Accomplish	Stimulate	Identified	Introjected	External	Extent
Know	0.876						
Accomplish	0.535	0.838					
Stimulate	0.420	0.474	0.789				
Identified	0.367	0.253	0.301	0.771			
Introjected	0.258	0.390	0.334	0.215	0.776		
External	0.041	0.080	0.225	0.017	0.351	0.784	
Extent	0.355	0.331	0.377	0.391	0.339	0.216	0.903

Table 6. Discriminant Validity of Constructs – Adopters

Construct	Helpless	Capacity	Effort	Strategy	Intention
Helpless	0.921				
Capacity	0.410	0.898			
Effort	0.475	0.339	0.860		
Strategy	0.465	0.092	0.360	0.831	
Intention	-0.479	-0.208	-0.402	-0.472	0.871

Table 7. Discriminant Validity of Constructs – Non Adopters

With assurance of good psychometric properties in the measurement model, the PLS structural model was next examined to access its explanatory power and the significance of the hypothesized paths. Hypotheses testing were performed by examining the size, the sign, and the significance of the path coefficients. Since PLS does not generate an overall goodness of fit index, the primary assessment of validity is by examining R^2 and the structural paths. Bootstrap re-sampling technique was employed to obtain the T-statistic for each path. Results of the PLS analysis of the research model for adopters and non-adopters are presented in Figures 3 and 4 respectively.

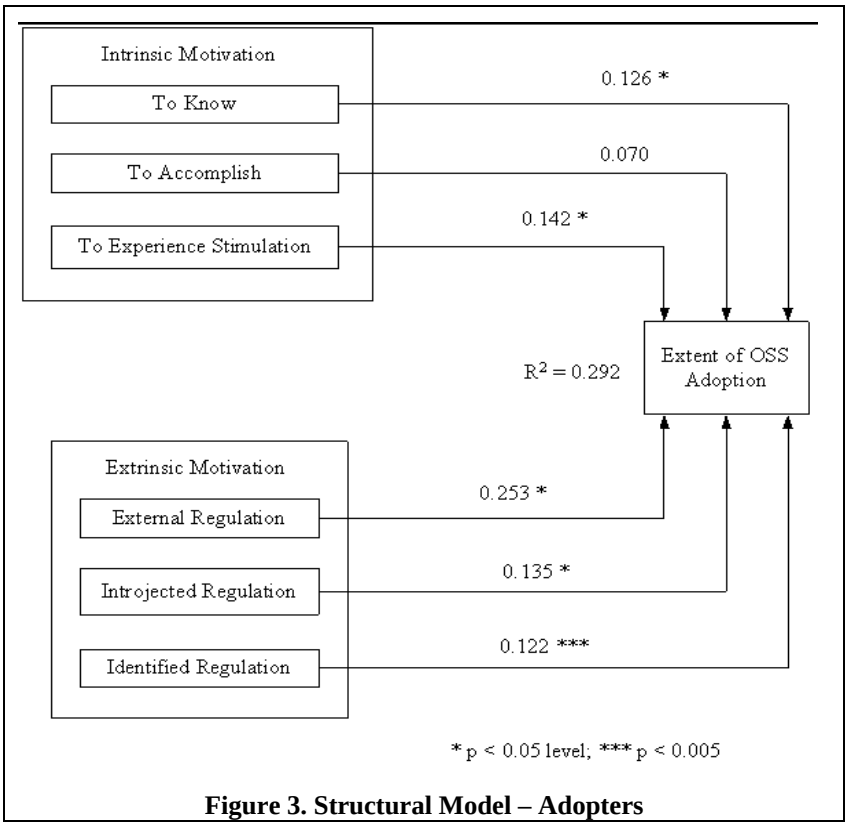

Figure 3. Structural Model – Adopters

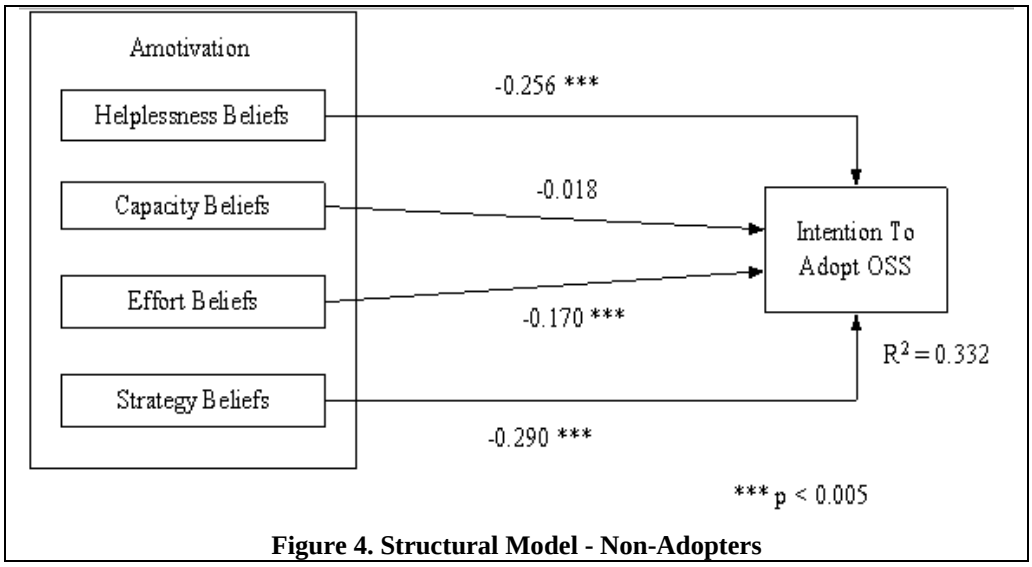

Figure 4. Structural Model - Non-Adopters

DISCUSSION

The explanatory power of the structural models was determined based on the amount of variance in the endogenous constructs for which the models could account. Approximately 29.2% of variance in the extent of OSS adoption was accounted for by the variables in the adopter's model [$R^2 = 0.292$]. Results show that all of the respective hypotheses, except for H1b (intrinsic motivation to accomplish), were supported. Identified regulation was a significant positive predictor for extent of OSS adoption (H2a). The path coefficient from identified regulation to extent of OSS adoption was significantly stronger ($t = 3.8320$, $p < 0.005$) than the other types of motivation which had almost similar significance. The relationship between intrinsic motivation to know and extent of OSS adoption was positively significant (H1a) at $t = 2.0862$, $p < 0.05$, so

was the relationship between intrinsic motivation to experience stimulation and extent of OSS adoption (H1c) at $t = 2.0359$, $p < 0.05$. The two factors of introjected regulation (H2b) and external regulation (H2c) as predictors for extent of OSS adoption were also both significant at $t = 2.1488$, $p < 0.05$ and $t = 2.0378$, $p < 0.05$ respectively. On the other hand, intrinsic motivation to accomplish (H1b) was not a significant predictor to extent of OSS adoption. This may be due to the fact that being human beings in the 21st century; with so many challenges in life to accomplish such as education and career, it would take more than the usage of certain software like OSS for them to feel an intrinsic motivation to accomplish. While previous researches (e.g. Li, Tan, and Teo 2004) have shown that intrinsic motivation to accomplish is a significant factor for program developers to contribute to an OSS project development, the mere usage of OSS may not be challenging enough for normal users to feel intrinsically motivated to accomplish.

Approximately 33.2% of variance in the intention to adopt OSS was accounted for by the variables in the non-adopter's model [$R^2 = 0.332$]. Results show that all of the respective hypotheses, except for H3b (capacity beliefs amotivation), were supported. Strategy beliefs amotivation was a significant negative predictor for intention to adopt OSS (H3d). The path coefficient from strategy beliefs amotivation to intention to adopt OSS was significantly stronger ($t = 4.3062$, $p < 0.005$) than the other two types of amotivation which had similar significance. The two hypothesized negative relationships of helplessness belief amotivation (H3a) and effort belief amotivation (H3c) as predictors for intention to adopt OSS adoption were both significant at $t = 3.3105$, $p < 0.005$ and $t = 3.0609$, $p < 0.005$ respectively. On the other hand, capacity belief amotivation (H3b) was not a significant negative predictor to intention to adopt OSS. This may be due to the fact that being young people with high education qualification in this information era, most of them are armed with basic knowledge and skills to apply different computer software. They generally believe they have the ability and capacity when it comes to using OSS. Thus amotivation arising from lack of capacity belief may not exist in this scenario.

Several theoretical implications can be derived from this study. First, our study extends the applicability of the Academic Motivation Scale (AMS) to a technological innovation adoption context like OSS. Previous studies on the AMS have focused only on an academic setting like the motivations for a student to go to school. Second, our study explores adoption from existing theoretical perspectives: Self Determination Theory (SDT) and Amotivation Theory, in order to have a richer understanding of extent and intention of OSS adoption. The perspective of Amotivation highlights the importance to study individual innovation adoption from the negative factors. Third, previous OSS adoption studies are mainly from the organizational perspective. This study would therefore contribute by investigating this issue from the individual's perspective and add to the cumulative literature on OSS adoption. Fourth, this study has looked at both adopters and non-adopters in order to eliminate the bias in sample population. Previous studies have mainly focused on either adopters or non-adopters adoption intention. Furthermore, by looking at the extent of OSS adoption for adopters and intention to adopt for non-adopters, we have looked at two measurement variables that best suit the respective group of individuals.

This study provides several practical implications for OSS vendors and developers. First, our results suggest that OSS vendors like RedHat should work on promotional programs and strategies that target on enhancing motivations of individuals to raise the awareness of OSS since it has been shown that motivations of individuals do affect their intention to adopt OSS and extent of adoption. Second, seeing that strategy belief amotivation is the major factor for non-adopter not to use OSS and identified regulation is the major factor affecting the extent of adoption by adopters respectively, vendors should especially look at strategy belief amotivations (e.g. by emphasizing the usefulness of OSS) and identified regulation motivation to further prioritize their strategy implementation on the more significant motivational factors. Third, this study confirms the importance of users' perspective in the adoption of a technology. Developers should therefore improve their OSS products with end users in mind since a developer's and a user's expectation of the software can be very different. And such difference may prevent the users from adopting of the software. We hope this study can also serve as a call for OSS developers to better communicate and understand users' needs.

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